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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,740	10/11/2005	Yasuhito Tsujii	052178	8301
38834 7590 05/29/2007 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			EXAMINER WOODWARD, ANA LUCRECIA	
			ART UNIT 1711	PAPER NUMBER
			MAIL DATE 05/29/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/525,740

Applicant(s)

TSUJII ET AL.

Examiner

Ana L. Woodward

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10/23/2006, 2/26/2007
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 3 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 2/26/07
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of the process species requiring the use of a self-cleaning horizontal twin-screw reaction apparatus comprising an inert gas-purging operation and a vacuating operations in the reply filed on February 26, 2007 is acknowledged.
2. Claims 3 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on February 26, 2007.

### ***Claim Rejections - 35 USC § 112***

3. Claims 1, 2 and 4-22, 24-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 13, "a polymer" is indefinite in that it is unclear as to whether or not it is referring to the antecedently recited "the polymer" (line 12) or to another polymer entity.

In claim 7, line 9, it is not understood what is meant by "a condensed water".

In claim 18, line 8, "a polymer" is indefinite in that it is unclear as to whether or not it is referring to the antecedently recited "the polymer" (line 12) or to another polymer entity.

In claim 20, it is unclear if or how the repeating unit (V) can be definitive of the diamine and dicarboxylic acid raw materials required in claim 7.

In claim 24, line 14, it is not understood what is meant by "a condensed water".

***Claim Rejections - 35 USC § 102/103***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 23 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. 6,489,435 (Tanaka et al) of record.

Tanaka et al disclose a continuous method for producing polyamide comprising a diamine component unit and a dicarboxylic acid component unit, said method comprising

(a) a raw material introduction step of introducing liquid (i.e., melted) diamine and liquid (i.e., melted) dicarboxylic acid into a batch-wise regulation tank, thereby preparing a molar-balanced mixture or slurry liquid substantially free from amidation reaction wherein a measuring device for measuring and accurately controlling the molar balanced is employed and

(b) feeding the slurry liquid thus prepared into a continuous polymerization reactor(s). In this process, the molar balance is detected and adjusted throughout the entire polymerization step in order to achieve the intended polymerization degree.

The disclosure of the reference meets the requirements of the above-rejected claim in terms of the types of materials added, process steps, operations and devices. It is maintained that

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the presently claimed raw material preparation step of “individually melting a diamine and a dicarboxylic acid” is met by the reference’s initial use of liquid (or melted) diamine and dicarboxylic acid components and the presently claimed step of introducing the raw materials into a polymerization reaction apparatus is met by the reference’s feeding of the slurry liquid of diamine and dicarboxylic acid into the polymerization reactor(s). The onus is shifted to applicants to establish that the process of the present claim is not the same as or obvious from that set forth by the reference.

7. Claims 7-17, 19-28, 30 and 32 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO 99/61511.

WO ‘511 discloses a continuous polymerization process for producing polyamide from molten dicarboxylic acid and molten diamine wherein devices for analyzing and controlling the flow rate to ensure the desired degree of polymerization are utilized. The process comprises a step of individually metering in the molten dicarboxylic acid and diamine components into a reaction vessel, a step of amidation, a step of polymerizing the polymerization mixture to form a prepolymer followed by further polymerization to increase the polymerization degree and relative viscosity of the polyamide to produce the final polyamide product. In accordance with the invention, said steps are performed in respective apparatuses which are connected in series (see figures) and include removal of condensation of water during the polymerization steps and adjustment of pressure.

The disclosure of the reference meets the requirements of the above-rejected claim in terms of the types of materials added, process steps, operations and devices. The onus is shifted

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to applicants to establish that the process of the present claim is not the same as or obvious from that set forth by the reference.

8. Claims 7-17, 19-28, 30 and 32 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO 99/61510.

WO '510 discloses an improved continuous polymerization system and control system for producing polyamide from molten dicarboxylic acid and molten diamine wherein the flow rate is continuously measured and adjusted to ensure the desired degree of polymerization. The process comprises a step of individually metering in the molten dicarboxylic acid and diamine components into a reaction vessel, a step of amidation, a step of polymerizing the polymerization mixture to form a prepolymer followed by further polymerization to increase the polymerization degree and relative viscosity of the polyamide to produce the final polyamide product. In accordance with the invention, said steps are performed in respective apparatuses which are connected in series (see figures) and include removal of condensation of water during the polymerization steps and adjustment of pressure.

The disclosure of the reference meets the requirements of the above-rejected claim in terms of the types of materials added, process steps, operations and devices. The onus is shifted to applicants to establish that the process of the present claim is not the same as or obvious from that set forth by the reference.

***Claim Rejections - 35 USC § 103***

9. Claims 7-17, 19-22, 24-28 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. 6,489,435 (Tanaka et al) described hereinabove.

Known continuous processes for producing polyamides contain a raw material blending step, an amidation step, an initial polymerization step and a late polymerization step, in which said steps are performed in respective apparatuses which are connected in series (column 1, line 47 – column 2, line 57, column 6, line 65 – column 7, line 17, etc.). Tanaka et al's continuous method comprises a step for preparation of the raw material, a step for amidation and steps for polymerization, wherein the latter step can be carried out using two or more continuous polymerization reactors according to the desired polymerization degree of the polyamide (column 7, lines 18-42). For this purpose, horizontal twin-agitator mixers are preferably used. Furthermore, the use of reactors having a high L/D are preferable (column 6, lines 38-41). In the polymerization steps, condensation water is removed, vacuum pressure is adjusted, temperatures higher than the melting point of the polyamide are employed and the degree of polymerization is controlled. See examples and claims. In this process, the molar balance is detected and adjusted throughout the entire polymerization step in order to achieve the intended polymerization degree.

In essence, the disclosure of the reference differs from the above-rejected claims in not expressly exemplifying the use of different reaction apparatus for performing the initial and final polymerization steps. It is maintained that it would have been obvious to one having ordinary skill in the art, and within the purview of the general disclosure of the reference, to have conducted the polymerization step in two continuous polymerization reactors, said reactors being connected such that the material product from the first polymerization reactor is fed to the second polymerization reactor resulting in the production of a final polyamide product having the intended degree of polymerization.

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As to the operation requirements, e.g., L/D, average residence times, shear rates, etc., per dependent claims, it would appear that such are either embraced (e.g., residence times, vacuation, etc.) or within the sphere of obviousness encompassed by the general disclosure of the reference to one having ordinary skill in the art. It would appear that manipulation of said operation variables, in accordance with the intended degree of polymerization and final product properties desired, would be within the purview and skill of the artisan of ordinary skill. Accordingly, absent evidence of criticality therefor, no patentability can be seen in the subject matter of the dependent claims.

10. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/61511 or WO 99/61510 in view of U.S. 6,489,435 (Tanaka et al), both described hereinabove.

The production of polyamides from MXD is well known in the art and would have been envisioned from the general disclosures of WO '511 and WO '510 by one having ordinary skill in the art. In this regard, it is noted that both references clearly teach that other monomers known to those skilled in the art could be used to produce other polyamides.

#### ***Response to Arguments***

11. Applicant's arguments filed October 23, 2006 have been fully considered but are not persuasive.

As regards claim 23, it is maintained that the disclosure of Tanaka et al meets the claimed requirements in terms of the types of materials added, process steps, operations and devices. It is maintained that the presently claimed raw material preparation step of "individually melting a diamine and a dicarboxylic acid" is met by the reference's initial use of liquid (or melted) diamine and dicarboxylic acid components and the presently claimed step of introducing the raw



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materials into a polymerization reaction apparatus is met by the reference's feeding of the slurry liquid of diamine and dicarboxylic acid into the polymerization reactor(s). There is at present no evidence to establish that the process of the present claim is not the same as or obvious from that set forth by the reference.

As to claims 7-17, 19-22, 24-28 and 30-32, it is maintained that it would have been obvious to one having ordinary skill in the art, and within the purview of the general disclosure of the reference, to have conducted the polymerization step in two continuous polymerization reactors, said reactors being connected such that the material product from the first polymerization reactor is fed to the second polymerization reactor resulting in the production of a final polyamide product having the intended degree of polymerization.

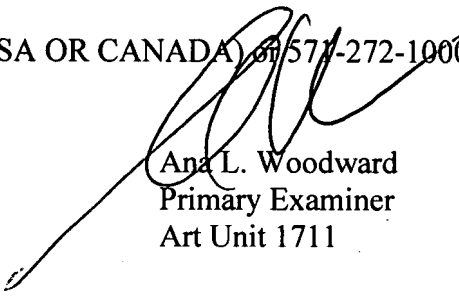
### ***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana L. Woodward whose telephone number is (571) 272-1082. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James J. Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 577-272-1000.



Ana L. Woodward  
Primary Examiner  
Art Unit 1711

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